

Application No. 09/414,004
Docket No. 37310-000144/US

Please cancel claims ~~1-13~~ and 15-40 without prejudice to or disclaimer of the subject matter contained therein.

Please add the following new claims ~~41-65~~ ⁷⁰ ✓

- c1
41. (New) An electron beam exposure tool, comprising:
an electron gun including an electron gun assembly; and
at least one lens array, placed in a drift space, adjacent to said electron gun, for
controlling emittance of said electron beam exposure tool.
42. (New) The electron beam exposure tool of claim 41, wherein said at least one lens array
is placed in said electron gun assembly.
43. (New) The electron beam exposure tool of claim 41, wherein said at least one lens array
is placed in a liner tube, connected to said electron gun assembly.
44. (New) The electron beam exposure tool of claim 43, wherein the liner tube and said
electron gun are secured vacuum-tight.
45. (New) The electron beam exposure tool of claim 43, wherein the liner tube and said
electron gun are bolted together.

Application No. 09/414,004
Docket No. 37310-000144/US

- C/ Cont'd*
46. (New) The electron beam exposure tool of claim 43, wherein the liner tube and said electron gun are welded together.
47. (New) The electron beam exposure tool of claim 41, said at least one lens array including at least one mesh grid.
48. (New) The electron beam exposure tool of claim 41, said at least one lens array including at least two mesh grids.
49. (New) The electron beam exposure tool of claim 41, said at least one lens array including at least three mesh grids.
50. (New) The electron beam exposure tool of claim 41, said at least one lens array including at least one continuous foil.
51. (New) The electron beam exposure tool of claim 41, said at least one lens array including at least one continuous foil.
52. (New) The electron beam exposure tool of claim 41, said at least one lens array having a transparency between 40-90%.

Application No. 09/414,004
Docket No. 37310-000144/US

53. (New) The electron beam exposure tool of claim 41, wherein said electron beam exposure tool is a SCALPEL tool, modified electron beam exposure system (MEBES) tool, or EBES tool.

54. (New) The electron beam exposure tool of claim 41, wherein said illumination component is a liner tube, connectable to an electron gun.

55. (New) The electron beam exposure tool of claim 41, wherein said lens array increases emittance of an electron beam by producing a divergent beam from an incoming electron beam

56. (New) The electron beam exposure tool of claim 47, wherein the emittance of the electron beam is increased by a factor substantially equal to $(L/d)^2$,

where L represents a pitch of said at least one mesh grid,

and d represents a diameter of a beam crossover created by each small opening in said at least one mesh grid.

57. (New) The electron beam exposure tool of claim 49, wherein said at least one lens array includes an odd number of mesh grids, including two outer mesh grids having a curved shape,

and wherein spherical aberration of an electron beam passing through said at least one lens array is reduced.

Application No. 09/414,004
Docket No. 37310-000144/US

- C1
Confid*
58. (New) A method of controlling beam emittance, comprising:
supplying an electron beam with an electron gun including an electron assembly; and
placing at least one lens array in a drift space, adjacent to the electron gun.
59. (New) The method of claim 58, wherein the at least one lens array is placed in the
electron gun assembly.
60. (New) The method of claim 58, wherein the at least one lens array is placed in a liner
tube, connected to said electron gun assembly.
61. (New) The method of claim 60, wherein the liner tube and the electron gun are secured
vacuum-tight.
62. (New) The method of claim 60, wherein the liner tube and the electron gun are bolted
together.
63. (New) The method of claim 60, wherein the liner tube and the electron gun are welded
together.
64. (New) The method of claim 58, wherein the at least one lens array includes at least one
mesh grid.

Application No. 09/414,004
Docket No. 37310-000144/US

65. (New) The method of claim 58, wherein the at least one lens array includes at least two mesh grids.

*C
Conc'd*
66. (New) The method of claim 58, wherein the at least one lens array includes at least three mesh grids.

67. (New) The method of claim 58, said at least one lens array including at least one continuous foil.

68. (New) The method of claim 58, said at least one lens array including at least one continuous foil.

69. (New) The method of claim 58, said at least one lens array having a transparency between 40-90%.

70. (New) The method of claim 58, wherein said method is performed by an electron beam exposure tool, including a SCALPEL tool, a modified electron beam exposure system (MEBES) tool, or an EBES tool.
